SOLAR OBSERVATIONS

SOLAR AND SKY RADIATION MEASUREMENTS DURING JULY, 1927

By HERBERT H. KIMBALL

For a description of instruments and exposures and an account of the method of obtaining and reducing the measurements the reader is referred to the REVIEW for January, 1924, **52**: 42, January, 1925, **53**: 29, and July, 1925, **53**: 318.

From Table 1 it is seen that solar radiation intensities averaged above the July normals at all three stations.

Table 2 shows an excess in the total solar radiation received on a horizontal surface from the sun and sky at all three stations for which normals have been determined, which was pronounced at Madison and Lincoln.

Skylight polarization measurements made at Washington on two days give a mean for 56 per cent, with a maximum of 57 per cent on the 28th. At Madison measurements obtained on seven days give a mean of 57 per cent, with a maximum of 69 per cent on the 2d. These are close to the corresponding averages for July at both Washington and Madison.

TABLE 1.—*Solar radiation intensities during July, 1927*

[Gram-calories per minute per square centimeter of normal surface]

Date	Sun's zenith distance									
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon
	75th mer. time	Air mass									Local mean solar time
		A. M.					P. M.				
	e.	5.0	4.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Washington, D. C.											
July 1	9.83					1.27	1.02	0.90			14.10
5	7.57		0.80	0.95	1.13	1.39					11.38
12	17.96					1.20					19.89
13	20.57			0.75							22.00
26	16.20					0.83					13.13
27	16.79					0.78					16.79
28	16.79				0.73	0.99					17.37
Means			(0.80)	(0.85)	(0.93)	1.08	(1.02)	(0.90)			
Departures			+0.14	+0.08	+0.04	−0.09	+0.04	+0.12			
Madison, Wis.											
July 1	17.37			0.77							16.79
2	10.59				1.24	1.44					10.59
6	13.61		0.91	1.02	1.18	1.38					17.96
18	11.81				1.11	1.34					12.24
19	7.87					1.39					9.47
20	8.18				0.98						8.81
23	11.81					1.30					10.21
25	11.81				0.92	1.20					12.24
26	13.61				0.89						13.13
27	13.13				0.93	1.14					12.24
28	16.20				1.16	1.23					17.37
29	10.97				1.10	1.31					8.81
Means			(0.91)	(0.90)	1.06	1.30					
Departures			+0.14	±0.00	+0.01	+0.02					
Lincoln, Nebr.											
July 1	14.10					1.40	1.23	1.08	0.97		12.24
2	11.38			1.04	1.19	1.36					10.97
3	9.47					1.32	1.09	0.91	0.77	0.65	12.24
4	13.61		0.79	0.93	1.15	1.35					13.13
7	11.38			1.17	1.31	1.46					11.38
8	11.38			0.93	1.09		1.10				12.24
9	13.61					1.39	1.17	0.99	0.84		12.24
23	10.97				1.09	1.28					9.83
25	12.68			1.01	1.18	1.38					12.68
26	12.68		0.84	1.00	1.14	1.35	1.03	0.82	0.66		13.61
27	15.65		0.77	0.90	1.11	1.33					14.60
Means			0.80	1.00	1.16	1.36	1.12	0.95	0.81	(0.65)	
Departures			±0.00	+0.10	+0.08	+0.03	+0.06	+0.07	+0.07	−0.07	

[1] Extrapolated.

TABLE 2.—*Solar and sky radiation received on a horizontal surface*

[Gram-calories per square centimeter of horizontal surface]

Week beginning	Average daily radiation						Average daily departure from normal		
	Washington	Madison	Lincoln	Chicago	New York	Twin Falls	Washington	Madison	Lincoln
1927	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
July 2	513	586	667	583	441	719	+37	+50	+87
9	456	475	568	384	370	750	−24	−57	−23
16	419	523	558	387	271	727	−49	+11	−18
23	516	557	591	467	374	607	+47	+68	+50
Deficiency since first of year on July 29							−7,630	−4,424	−5,285

POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. Edwin T. Pollock, Superintendent U. S. Naval Observatory]

[Data furnished by Naval Observatory, in cooperation with Harvard, Yerkes, and Mount Wilson observatories]

Date	Eastern standard civil time	Heliographic		Area [1]	
		Longitude	Latitude	Spot	Group
1927	*h. m.*	°	°		
July 1 (Naval Observatory)	11 47	−60.5	+15.0	93	
		−49.0	+16.5		340
		−4.0	−9.0		31
		+9.0	−8.0		432
		+46.0	+22.0		123
		+75.0	+21.0	62	
July 2 (Naval Observatory)	11 50	−66.5	−10.0	15	
		−48.0	+14.5		31
		−37.0	+16.0		370
		+22.5	−8.0		463
		+32.5	+23.5		46
		+58.0	+22.5		154
July 3 (Naval Observatory)	11 58	−52.5	−10.0	15	
		−34.0	+14.5		15
		−23.0	+16.0		432
		+35.5	−8.0		494
		+44.0	+23.0		62
		+72.0	+22.5		139
July 4 (Naval Observatory)	11 47	−77.0	−11.0		62
		−39.0	−10.0	12	
		−10.0	+15.5		370
		+49.0	−8.0		463
		+59.0	+22.5		62
July 5 (Naval Observatory)	11 53	−63.0	−11.0		62
		−53.0	−7.5	15	
		−25.0	−10.0	12	
		+4.0	+15.5		401
		+64.0	−8.0		463
		+73.0	+22.5		62
July 6 (Mount Wilson)	10 30	−46.5	−10.0		10
		+16.5	+14.0		737
		+78.0	−7.5		294
July 7 (Naval Observatory)	12 10	−37.0	−10.5	31	
		−26.5	−7.0	15	
		+12.5	−10.5		15
		+30.0	+15.0		432
		+62.0	+21.0		31
July 8 (Naval Observatory)	11 47	−72.0	−11.0	46	
		−22.0	−12.0	15	
		−13.5	−8.0		15
		+44.0	+17.5		401
July 9 (Mount Wilson)	10 30	−75.0	+25.0	3	
		−59.5	−7.0	14	
		−50.0	−22.5		10
		−5.0	−9.0		30
		+2.0	+12.5		2
		+56.0	+14.0		448
July 10 (Mount Wilson)	9 50	−63.0	+25.0	2	
		−46.0	−7.0	11	
		−37.0	−23.5		8
		−7.5	−8.5		27
		+17.0	+12.5		3
		+71.0	+14.0		240
July 11 (Naval Observatory)	11 52	−32.0	−7.5	15	
		−22.0	−23.0	9	
		+84.0	+16.0		309
July 12 (Naval Observatory)	11 50	+37.0	+10.5		31
July 13 (Naval Observatory)	11 48	−72.5	−12.5	123	
		+52.0	+10.5		19
July 14 (Naval Observatory)	11 42	−68.0	−14.0	15	
		−59.0	−13.0	216	
July 15 (Naval Observatory)	11 57	−71.0	−30.5	62	
		−55.5	−14.0	12	
		−46.5	−13.0		216
		−11.5	+14.0		46
July 16 (Naval Observatory)	11 43	−60.0	−30.5		15
		−32.0	−12.5	154	
		+2.0	+14.5		77
		+50.5	−12.0		108

[1] Areas are corrected for foreshortening and are expressed in millionths of Sun's visible hemisphere.